

A Software and Systems Process Improvement Initiative in NAVAIR: the Model Based Appraisal (MBA)

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Briefing Overview

- The Problem Being Addressed
- Solution to the Problem
- The MBA Process
- MBA Outputs
- How MBA Results Can be Used
- Appraisal Issues to Consider
- Interesting Lessons Learned
- Conclusions

The Problem Being Addressed

NAVAIR was looking for a cost-effective way to focus its process improvement efforts:

- Many projects are small and cannot afford the cost and time investment of an extensive SCAMPI
- For projects that achieved a formal rating, we'd like to do a quick look years after the formal appraisal
- For teams large and small, we'd like to do more than just identify if they have a process and follow it
- We'd like to help identify strengths and weaknesses of the processes being used throughout NAVAIR
- We'd like to learn from the stronger teams, and share good practices with teams that need help

Solution to the Problem

Our internally developed Model Based Appraisal (MBA) method solved our problem by:

- Providing a low-cost, quick, effective, accurate, and consistent appraisal method with minimal interruptions to the team
- Using a reference model already accepted by NAVAIR: CMMI
- Helping to establish a baseline against which to measure future process improvement
- Providing actionable improvement opportunities to the appraised teams
- Capturing process vulnerabilities and improvement opportunities across project teams

The MBA Process: Planning & Preparation

Each Appraisal starts with a Planning Phase:

- MBA Lead works with sponsor to develop Appraisal Plan focusing on the model and org scope.
- Because a consistent model scope was desired across NAVAIR, planning could be simplified somewhat.
- Data Collection plans adjusted to match expected availability of artifacts from the selected group

Next, Appraisal Preparation & Evidence Collection:

- The group being appraised provides agreed-upon artifacts to the MBA team
- MBA team reviews artifacts and develops interview questions
- MBA team conducts interviews to fill in the gaps left after reviewing artifacts

The MBA Process: Scoring

- Documentary and interview evidence for each in-scope process area (PA) at the practice level is entered into the observation workbook.
- Scores are assigned to each goal which is comprised of related practices. These scores are reflected in a grid chart commonly known as a quilt chart.
- Goals are scored to help identify which teams need help in which PAs using the CMMI as the reference model. Two scores are given:
 - “C” means they have coverage and are doing pretty well in this process area
 - “L” means they lack coverage and there is room for improvement with practices related to this PA.

The MBA Process: goal characterization

ID	Goals/Practices	Document Title or Description (linked)	Mapping Notes	Direct, Indirect, or Process Asset	Goal Score
SG1	Requirements are managed and inconsistencies with project plans and work products are identified.				C
SP1.1	Develop an understanding with the requirements providers on the meaning of the requirements.	Software Requirements Specification (Software Specification Alpha Tango d)	customer sign-off via email	Direct	
SP1.2	Obtain commitment to the requirements from the project participants.				
SP1.3	Manage changes to the requirements as they evolve during the project.	Demo of Requisite Pro showed Alpha Tango requirements actively tracked and updated		Direct	
SP1.4	Maintain bi-directional traceability among the requirements and the project plans and work products.	Demo of Requisite Pro showed Alpha Tango requirements traceability	ability to trace from direct and derived requirements to design components and then to code components	Direct	
SP1.5	Identify inconsistencies between the project plans and work products and the requirements.	Email notes from engineers to PM identifying omission of project tasking needed to fulfill requirements	Design components failed to address two requirements and emails requested additional time to revise the design to accommodate	Indirect	

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SP1.1	Develop an understanding with the requirements providers on the meaning of	Software Requirements Specification (Software Specification Alpha Tango.doc)	customer sign-off via email	Direct	
SP	to the requirements participants.				
SP	changes to the requirements as they evolve during the project.	Demo of Requisite Pro showed Alpha Tango requirements actively tracked and updated		Direct	

Example

Goal Scoring is subjectively determined by trained process personnel who consider the quantity and quality of evidence available for each SG. Based upon the evidence, the team gauges the extent to which the appraised team is implementing processes toward the achievement of each SG.

- Sufficient evidence exists to indicate that the intent of the goal is being addressed
- Sufficient evidence does not exist to indicate that the intent of the goal is being addressed

MBA Outputs: goal characterization

CMMI Maturity Level 2 Goals

Example

Goals	SG1	SG2	SG3	GG2
Process Area				
REQM	C			C
PP	C	L	L	C
PMC	C	L		L
SAM	L	L		L
MA	L	C		C
PPQA	C	L		L
CM	C	C	C	C



Sufficient evidence exists to indicate that the intent of the goal is being addressed



Sufficient evidence does not exist to indicate that the intent of the goal is being addressed

Partial
Sample

MBA Outputs: Suggested Actions Report

Suggestion	Expected Benefit/Rationale	CMMI Reference
Establish a standard for which sections of the SCR and Work Package forms (for instance, the modules/functionality affected check box) must be completed, when and by whom.	Ensure that all pertinent data is captured for future reference. After some amount of historical data has been captured, a simple but effective analysis can be generated to quantify the impact of various estimating attributes that can be used for future estimating efforts.	PP SP 1.2
Establish and reinforce policy/training for proper handling of products.	Training personnel in the proper handling of products in the lab and products in transition to the customer will reduce the risk of product failures.	SAM SP 2.4
Document training plans	Process OJT suffers degradation as it passes from person to person if there is no outline of critical information that must be maintained.	GP 2.5

MBA Outputs: Suggested Actions Report

- The suggested action report provides actionable recommendations to the appraised group.
- Many suggested actions can be re-used across multiple teams, as a result, over time, creating the report doesn't take as much time as you might think.
- When teams act on the suggested actions, resulting solutions can be shared with other teams with similar needs

How MBA Results Can Be Used

Project:

- Project team members and other stakeholders or their management receive a brief of the Final Findings and the Suggested Actions Report.
- Final Findings identify what was found. The Suggested Actions report explains recommendations for change and what benefits can be expected from making each change.
- The Suggested Actions report addresses every “L” on the quilt chart so the severity of the gaps is known.
- The report may also address a “C” if there is a good opportunity for further improvement in that area.

How MBA Results Can Be Used

Product Team:

- The recommendations in the Suggested Actions Report may be applicable to all projects within the product team that perform similar work and use the same processes
- The product team will be able to select the process improvements that make the most sense to them
 - This determination should be made based upon a combination of business priorities, benefits they'll receive from the change, and ability to implement the change (i.e., resource availability, skills, cost, etc.).
- Product teams need to encourage their projects to act upon the findings, and actually implement the suggested changes that are deemed appropriate

How MBA Results Can Be Used

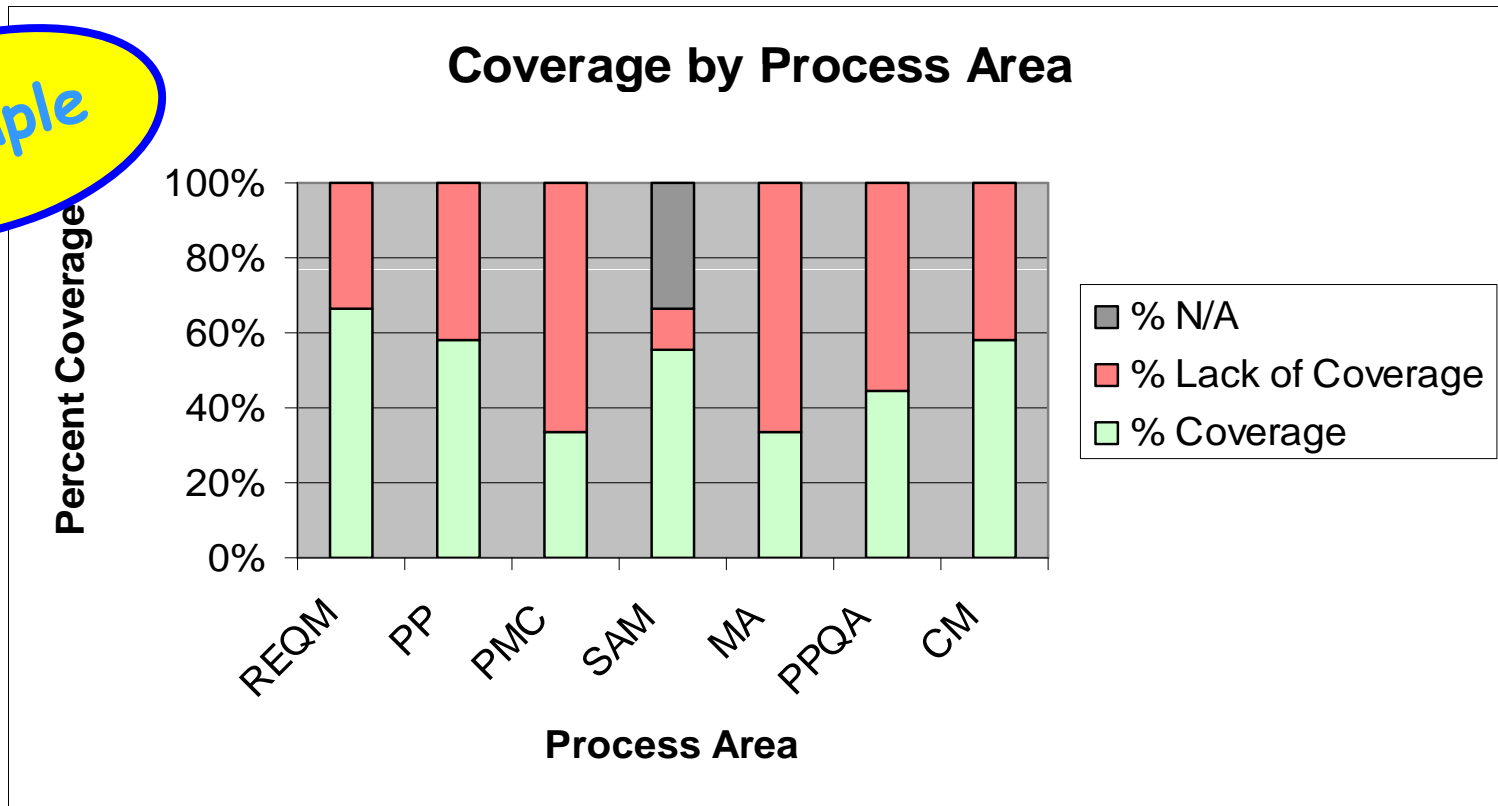
SSEPG for Product Teams:

- The “L”s in the aggregated quilt chart will allow the SSEPG to identify, by PA, where an organization’s teams need the most help.
- The SSEPG can make a first pass and select the PAs with the highest number of “L”s.
- In a second pass, it can investigate these select PAs in greater depth in order to determine root causes of the problems. (*A common root cause can be addressed by one solution that can be shared across product teams.*)
- The SSEPG can then identify high ROI opportunities across teams where process performance is low and there appears to be a *common root cause*.

How MBA Results Can Be Used

Sample SSEPG Analysis

Example



How MBA Results Can Be Used

Organizational Leadership:

- The organizational leaders will see the aggregated quilt chart and sanitized analyses from individual product team SSEPGs
- The leaders get a factual Model Based Appraisal based upon a sampling of projects within the org. This baseline serves as a yardstick against which to evaluate PI progress (and ROI) in the future.
- The present value of the baseline is a foundation for discussions pertaining to desired capability levels (e.g., target capability profiles).
- The baseline will help the organization and individual SSEPGs communicate better concerning PI priorities.

Appraisal Issues to Consider

- Recommendations – Delivery of a Suggested Actions Report is fairly unique to our MBAs, but is extremely useful
- Planning – Planning must be thorough to ensure appraisal stays focused on the team's most meaningful processes
- Level of rigor – Appraiser should look at the entire picture, review the evidence, and talk to the process participants
- Quantity/depth of evidence reviewed – A quick look at a few pieces of evidence may not be sufficient to provide a good set of actionable recommendations to the appraised organization
- Quantity/quality of Final Findings – Details of any appraisal that will go beyond the immediate team must be balanced by appraisal principles i.e. anonymity and non-attribution

Interesting Lessons Learned

- The shorter the prep time for interviewed employees the more realistic of a snapshot will be obtained
- Remote MBAs are a viable option which can enable the professionals to do more appraisals efficiently
- Remote MBAs enable team members who are on travel (or even on vacation) to be interviewed with the same ease as if they were present
- If interviews cannot be done at the scheduled date, there is less impact to the process with remote MBAs since completion schedule can be more flexible
- The above lessons are what enable the MBA to be performed at low cost and low impact to the projects

Conclusions

- MBAs enable the product team or organization SSEPGs to identify, prioritize and correct process deficiencies at various levels
- MBAs provide actionable process improvements relevant to the appraised organizations
- MBAs provide a snapshot of process maturity across the organization so improvements can be measured
- Team should fully and enthusiastically support this MBA approach because of the potential return on investment
- Organizations should establish policy to follow-up and act upon the findings and recommendations generated from the MBAs